

CLAIMS

What is claimed is:

1. A laser comprising:
 - a resonating chamber having a front mirror and a back mirror forming an optical propagation path;
 - an optical gain medium located between the front and back mirrors within the resonating chamber, wherein the optical gain medium is configured to produce a laser light along the optical propagation path; and
 - a birefringent lens located within the resonating chamber, wherein the birefringent lens is configured to focus and to affect the polarity of the laser light passing through the birefringent lens.
2. The laser of claim 1 wherein the birefringent lens is comprised essentially of an optically active material.
3. The laser of claim 2 wherein the optically active material is quartz.
4. The laser of claim 2 wherein the optically active material is calcite.
5. The laser of claim 1 wherein the birefringent lens comprises a curved exterior surface.
6. The laser of claim 1 wherein the birefringent lens is a concave lens.
7. The laser of claim 1 wherein the optical gain medium is a solid state disk.
8. The laser of claim 1 wherein the optical gain medium is a solid state rod.
9. The laser of claim 1 wherein the optical gain medium is a solid state slab.

10. A laser resonator for producing a laser beam, the resonator comprising:
 - a chamber having a front mirror and a back mirror defining a
optical propagation path;
 - an optical gain medium located between the front and back mirrors
within the chamber, wherein the optical gain medium is
configured to produce a laser light along the optical
propagation path in response to pump radiation; and
 - a birefringent lens located within the resonating chamber, wherein
the birefringent lens is formed of an optically active
material and comprises a substantially curved exterior
surface to focus the laser light while adjusting the polarity
of the laser light passing through the birefringent lens,
thereby forming the laser beam.
11. A birefringent lens for a laser, the birefringent lens having a substantially
curved exterior surface configured to focus light passing through the
birefringent lens, and wherein the birefringent lens comprises an optically
active material configured to adjust the polarization of the light passing
therethrough.
12. The birefringent lens of claim 11 wherein the optically active material
comprises calcite.
13. The birefringent lens of claim 11 wherein the optically active material
comprises quartz.
14. The birefringent lens of claim 11 wherein the curved surface is concave
such that the birefringent lens is a converging lens.
15. The birefringent lens of claim 11 wherein the curved surface is convex
such that the birefringent lens is a diverging lens.

16. A laser for producing a laser beam, the laser comprising:
 - a first mirror having a first reflective surface;
 - a second mirror having a second reflective surface;
 - a gain medium displaced between the first and second reflective surfaces adjacent the first mirror and configured to produce laser light therebetween; and
 - an integrated birefringent lens displaced between the gain medium and the second mirror, wherein the integrated birefringent lens comprises an optically active material and a curved surface to thereby simultaneously affect both the polarization and focus of light passing therethrough.
17. The laser of claim 16 further comprising a second lens displaced between the first mirror and the gain medium.
18. The laser of claim 17 wherein the second lens is a birefringent lens.
19. The laser of claim 17 wherein the optically active material comprises quartz.
20. The laser of claim 17 wherein the optically active material comprises calcite.